A premise of the Building America program is that high performance homes must be sustainable both environmentally *and* economically. EcoVillage Cleveland takes this premise to a new level. From location to lumber to lighting—energy efficiency, resource efficiency, and durability rule at EcoVilllage Cleveland, but not without affordability. EcoVillage Cleveland is about local and individual sustainability.

Location and Layout The urban infill site was chosen for EcoVillage in large part because it is within a 5-minute walk of a newly renovated rail station. Where formally 10 single-family houses stood in disrepair, there will now be 20 state-of-the-art town homes. The 3-story units have stepped down, walk-in basements with natural light, thermal envelope, and layout ideal for a separate quality rental unit or extended family living. The 2-story units are slab-on-grade and designed to be more accessible. Each of these design features gives value to the owner, to the community, and to the environment.

Energy Efficiency and Occupant Comfort/Health Building a home that costs little to heat and cool that also safeguards its occupants requires integration of engineering and architecture. At EcoVillage, the wall assemblies, controlled mechanical ventilation, sealed combustion furnace and water heater, sealed ducts in conditioned space, interior finishes, and even detached garage work together to provide comfort and reduce the health hazards associated with mold, soil gases (including radon), combustion byproducts, volatile organic compounds, and occupant activities (See the *Houses That Work – Cold Climates* for more details). Do some of these features cost more initially? Yes, but some cost less, keeping high performance affordable.

Material efficiency Resource efficiency starts with *use less*—EcoVillage employs every advanced framing technique available. And the multi-family design inherently uses less material overall. Resource efficiency also means *select the right stuff*. The two most used materials at EcoVillage, as with most buildings, are wood and concrete. EcoVillage calls for Forest Stewardship Council (FSC)-certified lumber or salvaged wood for everything from framing lumber to trim and cabinets. Concrete and concrete block at EcoVillage are specced for high content blast furnace slag or flyash, both waste materials that can replace up to 50% of the very energy-intensive Portland cement used in concrete. Lastly, from landclearing to packaging—wood,drywall, and cardboard waste will be recycled or processed for use on site. Once again, some of these features come with a small cost premium while others produce savings, making material efficiency overall economical.

Durability When a home and its components are built for the long haul, maintenance costs are lower and the home maintains its value. The environment benefits from less use of material. Durability must be designed and engineered into a home. Much of the building science detailed in *Houses That Work – Cold Climates* and the *Builder's Guide – Cold Climates* results in foundation, wall, and roof assemblies that perform as finely-tuned systems that safeguard building components from degrading forces such as liquid water, water vapor, extreme temperatures, and ultra-violet light.

U.S. Department of Energy
Building America
Program Partner

Quality Quality is a three-legged stool involving design, materials, and installation. You need all three to achieve superior qual-

EcoVillage Cleveland at 58th Street Cleveland, Ohio

Detroit Shoreway Community Development Organization

20 town homes, 2- and 3-story units with an average of 1,600 sq. ft.

Key Features

- High density urban infill with rapid transit access
- Quality extra living space on lower level
- Detailed plans and "green" specifications
- Ducts in conditioned space
- Controlled ventilation
- Detached garages
- High performance envelope, windows and HVAC
- Advanced framing; FSC-certified lumber and finished wood products
- Pervious concrete and salvaged brick pavers
- Extensive construction waste recycling — on and off site

Key Partners/Products

- Engineering: Renovation Planners
- Landscape Architecure: Kerr+Boron Associates, LLC

ity. Quality gives you superior economic and environmental performance as well. At EcoVillage, quality is driven by highly detailed architectural drawings and construction details, and project specifications that include environmental considerations.

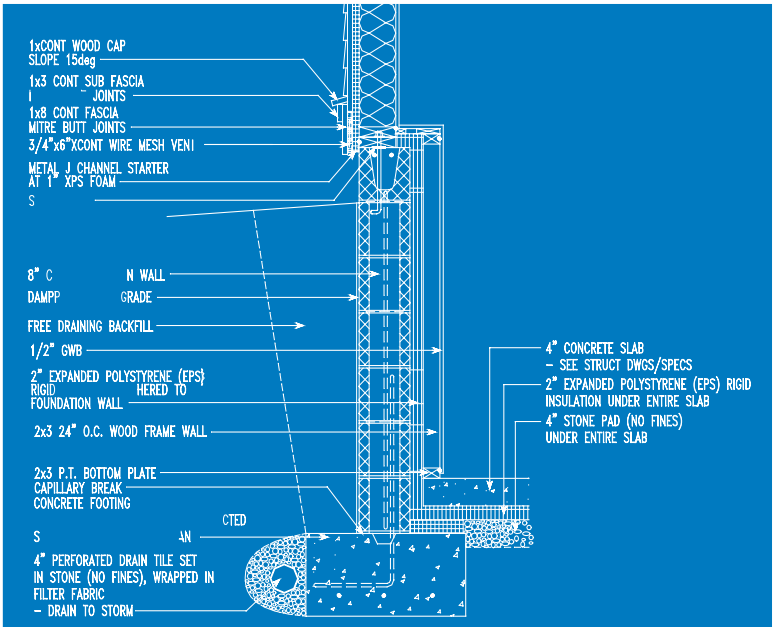
The drawings and construction details for the EcoVillage project run more than 60 pages. They include complete framing layout and detailed cross sections for *every* wall assembly (and there are many different types). The drawings were designed to be used at the job site by the site superintendent and all of the trades. The EcoVillage set of drawings is complemented by the project specifications. Throughout the project specs are specific references to building principles and detailed graphics from the *Builder's Guide – Cold Climates*. The general contractor and each subcontractor at EcoVillage will receive a copy of this *Builder's Guide*.

How do you add new specs related to environmental performance and still get in the standard language contractors will need? Since we could not find specifications for resource-efficiency to "plug into" the EcoVillage Cleveland project—we wrote our own. To develop our own "green" specification language, we did draw on resources such as *GreenSpec* (www.buildinggreen.com/bg/gsMenu.jsp). This language was weaved into existing standard spec language. And wherever we could anticipate that obtaining or locating less-familiar materials could be a hardship for the contractor or sub, we included complete distributor/manufacturer information within the specs. (See EcoVillage Sample Spec Language).

It can be difficult to find the information you need for alternative materials and methods, or to convince contractors, distributors, and even building inspectors that they are acceptable or even preferable. Alternative materials are often unfamiliar to both suppliers and the trades, resulting in a price or labor premium, or both. FSC-certifed lumber and high content slag/flyash concrete are two prime examples. But resources are available (click here for more information on suppliers of FSC-certified wood products (www.certifiedwood.org and here for "Some Basics About Substituting Pozzolans for Portland Cement in Concrete"). And as more projects such as EcoVillage Cleveland forge the way, the learning curve and ready supply of materials for other builders and clients will improve.

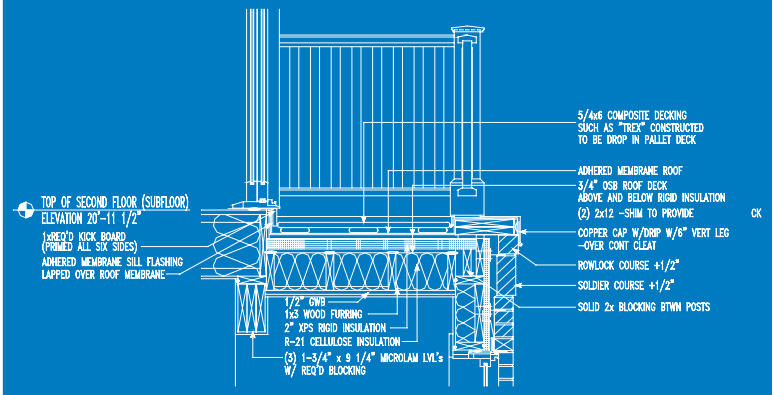
In planning, design, and specifications, EcoVillage is set up to be an exemplary science-smart, green, affordable project. As the project moves toward the construction phase, we will keep you posted on what elements do and do not survive and why. David Rowe, Detroit Shoreway project manager puts it this way: "With BSC, we have done everything we could to make this project the right blend of innovation and feasibility. It's time now to work with the right contractor in building a new type of Cleveland at 58th Street." Every aspect of the EcoVillage project that promotes sustainability will deliver value to both the region and the home owner. That's the Building America Way.

See the EcoVillage Energy Analysis for more information about energy savings.



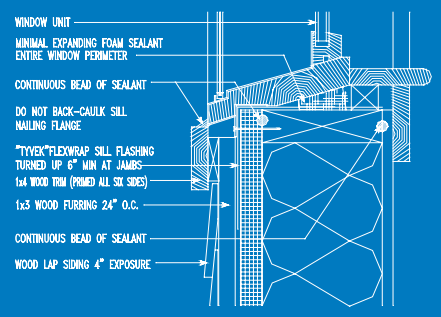
Foundation

Note the type and location of rigid insulation in terms of both thermal and moisture performance, the complete and continuous drainage details for bulk moisture, and the air sealing details as the foundation meets the framing assemblies above.



Balcony detail

Although the roof lines of the main structures at EcoVillage Cleveland are relatively straightforward, there are complex cladding, flashing, and air sealing details for the second story porches and the bump-out column bay on Unit 1. Achieving superior energy efficiency and durability with these details requires detailed drawings for follow-through during construction.



Wall section

For each type of exterior wall cladding (and there are three—brick, stucco, and lap siding), the wall assembly is tuned in terms of maintenance of the drainage plane, back-venting of the cladding, air infiltration barrier, vapor retarding properties of materials, and thermal insulation employed. Each wall system is an integrated system controlling the movement of heat, moisture, and air.